

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-216865

(43)Date of publication of application : 10.08.2001

(51)Int.Cl.

H01H 13/48
H01H 13/52

(21)Application number : 2000-027860 (71)Applicant : FUJI DENSHI KOGYO KK

(22)Date of filing : 04.02.2000 (72)Inventor : MASUDA MASAJI

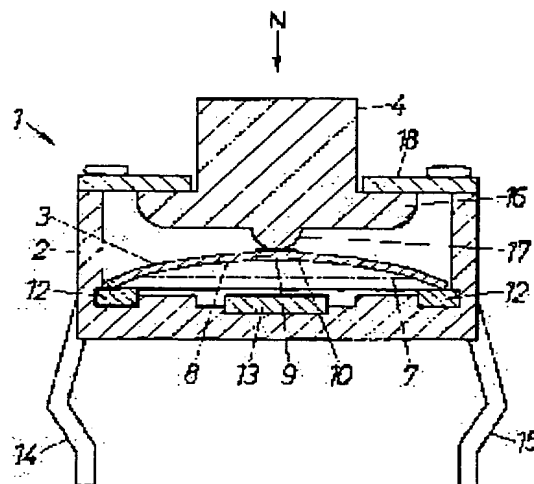
(54) SWITCH

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a contact spring with a clicking action which is superior in the electrical stability in the contact between a movable contact part of the contact spring and a fixed contact part without curtailing the life of the contact spring in repeated uses of the dome-shaped contact spring with the clicking action.

SOLUTION: A hollow 9 is formed on an inner central part, that is a movable contact part 8 of the dome-shaped contact spring 3 with the clicking action, and an edge part 20 formed around the hollow 9 is linearly kept into contact with a surface of a fixed contact part 13, whereby the electrical stability in the contact of the movable contact part

8 and the fixed contact part 13 can be ensured, and the shortening of the service life of the contact spring 3 can be prevented since the movable contact part 8 is not perforated.



LEGAL STATUS

[Date of request for examination] 19.12.2001

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against
examiner's decision of rejection]

[Date of extinction of right]

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(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2001-216865

(P2001-216865A)

(43) 公開日 平成13年8月10日 (2001.8.10)

(51) Int.Cl.⁷

識別記号

F I

ターム(参考)

H 0 1 H 13/48

H 0 1 H 13/48

5 G 0 0 6

13/52

13/52

F

審査請求 未請求 請求項の数 3 O L (全 4 頁)

(21) 出願番号 特願2000-27860 (P2000-27860)

(22) 出願日 平成12年2月4日 (2000.2.4)

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Fターム(参考) 5G006 AA01 AB25 BA01 BA02 BA09

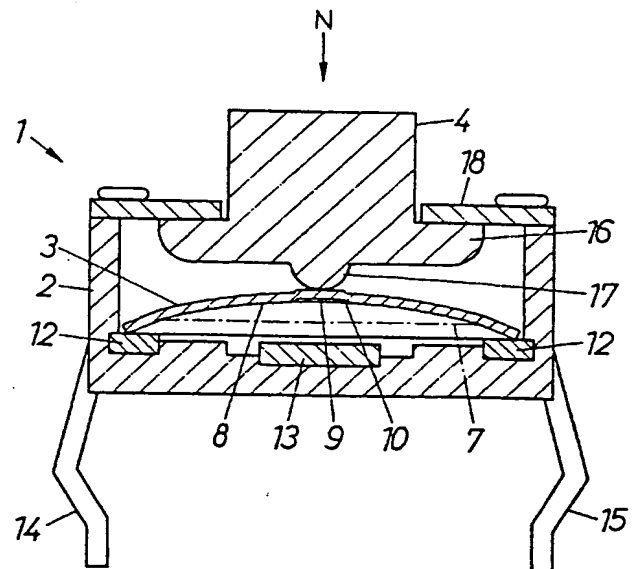
BB03 DB03 FB04 LA01

(54) 【発明の名称】 スイッチ

(57) 【要約】

【課題】 ドーム状でクリックアクション付きの接点ばねを繰り返し動作させたとき、その接点ばねの寿命を低下させないで、接点ばねの可動接点部と固定接点部との接触の電気的な安定性に優れたクリックアクション付きの接点ばねを提供する。

【解決手段】 ドーム状でクリックアクション付きの接点ばね3の内側中央部分すなわち可動接点部8に窪み9を形成し、この窪み9の周囲に形成されるエッジ部10を固定接点部13の表面に対して線接触により接触させることによって、両者間の接触の電気的な安定性を確保すると同時に、可動接点部8に孔をあけない形状とすることにより、接点ばね3の寿命の低下を防いでいる。



【特許請求の範囲】

【請求項1】 ドーム状でクリックアクション付きの接点ばねの内側中央部分を可動接点部とし、この可動接点部を固定接点部に対して接離させて、上記可動接点部と上記固定接点部との間を電氣的にオン・オフの状態とするスイッチにおいて、上記可動接点部に窪みを形成し、この窪みの周囲に形成されるエッジ部を上記固定接点部の表面に接触させることを特徴とするスイッチ。

【請求項2】 スイッチケースに、ドーム状でクリックアクション付きの接点ばね、および上記接点ばねの頂部に当接し上記接点ばねの弾性変形方向に変位自在の操作ボタンを収納し、上記接点ばねの外周部分を接触片に当接させるとともに、上記接点ばねの内側中央部分を可動接点部とし、この可動接点部を上記スイッチケース内で固定接点部に対して接離させて、上記可動接点部と上記固定接点部との間を電氣的にオン・オフの状態とするスイッチにおいて、上記可動接点部に窪みを形成し、この窪みの周囲に形成されるエッジ部を上記固定接点部の表面に接触させることを特徴とするスイッチ。

【請求項3】 窪みを円形、だ円形、多角形、星形のいずれかの形状として形成することを特徴とする請求項1または請求項2記載のスイッチ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、オーディオ機器、ビデオ機器、通信機器、測定機器などの電気機器や電子機器に用いられる信号入力用のスイッチに関わり、特にドーム状でクリックアクション付きの可動接点ばねの改良に関する。

【0002】

【従来の技術】 従来、電気機器や電子機器の信号入力部に用いられるスイッチは、ドーム状でクリックアクション付きの接点ばねと、この接点ばねの内側の可動接点部に対向する固定接点部とを有している。可動接点部は、固定接点部に対する面接触による接触不良を防止するために、最近では孔を有する可動接点部が用いられることが多い。

【0003】 接点ばねは、スイッチ操作時に、接点ばねの頂部に作用する押圧力により弾性変形し、反りの方向をクリックアクションのもとに反転させる。この反転時に、可動接点部の孔の外周のエッジ部と固定接点部とは、線接触により接触し、電氣的にオンの状態となり、スイッチの用途に応じた信号を発生する。このように、可動接点部の孔の存在によって、可動接点部のエッジ部と固定接点部との接触が面接触に代わって線接触となり、微細なごみなどに対して、エッジ部での接触圧力が高くなることにより、可動接点部と固定接点部との接触の電氣的な安定性が大幅に改善される。

【0004】

【発明が解決しようとする課題】 可動接点部に孔をあけ

て、板状のばね材をドーム状に成形して、ドーム状でクリックアクション付きの接点ばねを製造するとき、成形後にばね材のスプリングバックにより、接点ばねが均一なドーム形状にならず、動作特性としての移動量（ストローク）が大きくなってしまい、接点ばねの繰り返し使用時に、孔の周囲にかかる引っ張り応力や、圧縮応力が大きくなり、孔の周囲にクラックが入り易くなる。このため、製品としての寿命が短くなってしまうという問題がある。特に、接点ばねのサイズが小さくなっている現在、この傾向は高くなっている。

【0005】 したがって、本発明の目的は、ドーム状でクリックアクション付きの接点ばねを繰り返し動作させたとき、その接点ばねの寿命を低下させないで、接点ばねの可動接点部と固定接点部との接触の電氣的な安定性に優れたクリックアクション付きの接点ばねを提供することである。

【0006】

【課題を解決するための手段】 上記目的のもとに、本発明は、ドーム状でクリックアクション付きの接点ばねの内側中央部分すなわち可動接点部に窪みを形成し、この窪みの周囲に形成されるエッジ部を固定接点部の表面に対して線接触により接触させることによって、両者間の接触の電氣的な安定性を確保すると同時に、可動接点部に孔をあけない形状とすることにより、接点ばねの寿命の低下を防いでいる。

【0007】 具体的に記載すれば、本発明のスイッチは、スイッチケースに、ドーム状でクリックアクション付きの接点ばねおよび上記接点ばねの頂部に当接し上記接点ばねの弾性変形方向に変位自在の操作ボタンを収納し、上記接点ばねの外周部分を接触片に当接させるとともに、上記接点ばねの内側中央部分を可動接点部とし、この可動接点部を上記スイッチケース内で固定接点部に接離させて、上記可動接点部と上記固定接点部との間を電氣的にオン・オフの状態とするスイッチにおいて、上記可動接点部に窪みを形成し、この窪みの周囲に形成されるエッジ部を上記固定接点部の表面に接触させている。

【0008】 ここで、上記の窪みは、円形、だ円形、多角形、星形のいずれかの形状として形成される。また、エッジ部は、窪みの周囲で連続した状態として、または不連続な状態として形成される。

【0009】

【発明の実施の形態】 図1は、本発明のスイッチ1のオフの状態を示しており、図2は、そのオンの状態を示している。これらの図で、スイッチ1は、スイッチケース2内で、ドーム状でクリックアクション付きの接点ばね3、およびこの接点ばね3の頂部に当接し、接点ばね3の弾性変形方向に変位可能な操作ボタン4を収納している。

【0010】 接点ばね3は、図1、図2のほか図3およ

び図4に見られるように、例えば厚み0.06mm、直径3.5mm程度のステンレス板によって、所定の曲率のドーム部5と、このドーム部5の外周縁部分で円錐面により形成されるスカート部6とによって、全体として一体的なドーム状に形成されており、それらの境界部分は、環状の屈曲部7となっている。接点ばね3の内側中央部分すなわちドーム部5の内側中央部分は、銀めっき層による可動接点部8であり、この可動接点部8で円形の窪み9を形成し、この窪み9の周囲でエッジ部10を形成している。この窪み9は、通常、接点ばね3のプレス機による打ち抜き曲げ加工と同時に形成されるため、窪み9に対応する外側面に突部11が形成される。

【0011】接点ばね3のスカート部6の下端部分は、スイッチケース2の内部に納められた状態で、スイッチケース2の底部に埋め込まれている例えば環状の接触片12に対し常に接触し、電氣的に導通状態となっている。また、可動接点部8のエッジ部10は、スイッチケース2の底部中央に埋め込まれている固定接点部13に対向し、それに接触して、電氣的に導通可能な状態となっている。なお、接触片12および固定接点部13は、それぞれスイッチケース2の外部に露出している接続端子14、15と一体となっている。

【0012】そして、操作ボタン4は、スイッチケース2の内部で、端部の突起17により接点ばね3のドーム部5の頂部の突部11に当接し、接点ばね3の弾性変形方向に変位自在となっており、フランジ部16とスイッチケース2に固定されたスイッチカバー18との当接により一部を外部に突出させた状態で保持されている。

【0013】図5は、接点ばね3のストロークS（横軸）に対する動作荷重N（縦軸）の特性のグラフを示している。図4に見られるように、接点ばね3のドーム部5の中心に対し法線方向の動作荷重Nが作用すると、可動接点部8（エッジ部10）のストロークSは、ほぼ正比例しながら増加するが、動作荷重N1によって、ストロークSがクリックアクションを起こすストロークS1を過ぎると、接点ばね3は、クリックアクションにより反りの方向を反転させ、今までよりも小さな動作荷重Nによっても同じストロークSの方向に移動し、その後、小さな動作荷重N2に対応する力で、ストロークS2となり、反転したままの状態を維持する。動作荷重N2がなくなれば、接点ばね3は、逆方向に再び反転し、もとの状態に復帰する。

【0014】操作者が操作ボタン4を下向きに押し付けると、接点ばね3は、その動作荷重Nに応じて弾性変形し、偏平な状態となる。可動接点部8（エッジ部10）がクリックアクションを起こすストロークS1を過ぎると、接点ばね3は、図2および図6に見られるように、屈曲部7を屈曲線として反りの方向を反転させ、可動接点部8のエッジ部10を固定接点部13の表面に接触させる。これによって、可動接点部8のエッジ部10と固

定接点部13は、電氣的に導通し、オンの状態となる。

【0015】このオンの状態で、可動接点部8のエッジ部10は、環状の線接触となって固定接点部13の表面に接触する。したがって、それらの接触部分の間に微細なごみなどが付着したとしても、固定接点部13に対する可動接点部8のエッジ部10の接触圧力が高くなるため、可動接点部8のエッジ部10と固定接点部13との接触の安定性が大幅に改善され、電氣的な特性も良好となる。

10 【0016】しかも、窪み9の形成によって、プレス加工時の曲げひずみ応力が窪み9の周囲に残るものの、窪み9の部分のひずみ応力は、孔を形成したときの剪断ひずみ応力よりも小さく、また、接点ばね3の弾性変形時に、窪み9の周囲にかかる引っ張り応力や、圧縮応力が孔に比較して小さくなっている。したがって、接点ばね3の窪み9の部分にクラックが入りにくく、従来のものに比較して接点ばね3の寿命が長くなる。なお、窪み9の深さは、接点ばね3のばね特性に影響を与えるため、接点ばね3の板厚の2/3以下に抑えておくことが好ましい。

20 【0017】ちなみに、窪み9の形状は、円形に限らず、図7に示すように、だ円形、多角形、星形などの形状として形成することもできる。また、窪み9は、図8に示すように、接点ばね3の可動接点部8に窪み9となる部分の外周部分を固定接点部13の方向に隆起させることによって形成することもできる。この場合、エッジ部10は、その隆起部分と窪み9との間に形成されることになる。ちなみに、窪み9は、半球面状のものであってもよい。さらに、エッジ部10は、好ましい例として環状で連続しているが、不連続な状態で形成されていてもよい。

30 【0018】

【発明の効果】本発明では、接点ばねの可動接点部の窪みの周囲に形成されるエッジ部が固定接点部の表面に線接触により接触するから、微細なごみなどの介在によっても、それらの間の接触圧力が高められ、電氣的に安定な接触状態が確保でき、また、接点ばねの可動接点部に孔があけられていないため、窪みの周囲に発生する引っ張り応力や圧縮応力が孔に比較して低く抑えられ、エッジ部にクラックが入りにくく、接点ばねの寿命が長くなり、長時間にわたって安定なスイッチング機能が期待できる。

40 【図面の簡単な説明】

【図1】本発明のスイッチでオフの状態の断面図である。

【図2】本発明のスイッチでオンの状態の断面図である。

【図3】接点ばねの平面図である。

【図4】接点ばねの断面図である。

50 【図5】接点ばねのストローク-動作荷重のグラフであ

環状
または
円錐面

る。

【図6】接点ばねの可動接点部のエッジ部と固定接点部との接触状態の一部の拡大断面図である。

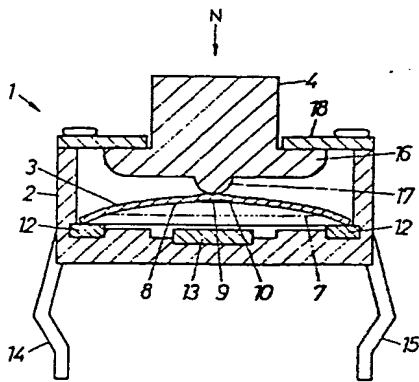
【図7】他の形状の窪みの平面図である。

【図8】他の窪みの一部の拡大断面図である。

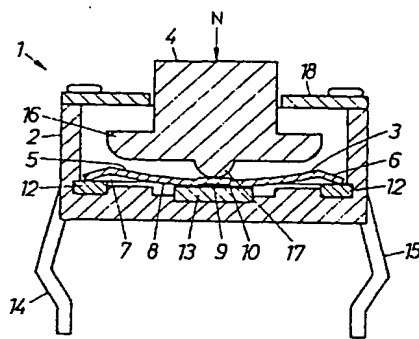
【符号の説明】

- | | | | |
|---|---------|----|---------|
| 1 | スイッチ | 7 | 屈曲部 |
| 2 | スイッチケース | 8 | 可動接点部 |
| 3 | 接点ばね | 9 | 窪み |
| 4 | 操作ボタン | 10 | エッジ部 |
| 5 | ドーム部 | 11 | 突部 |
| 6 | スカート部 | 12 | 接触片 |
| | | 13 | 固定接点部 |
| | | 14 | 接続端子 |
| | | 15 | 接続端子 |
| | | 16 | フランジ部 |
| | | 17 | 突起 |
| | | 18 | スイッチカバー |

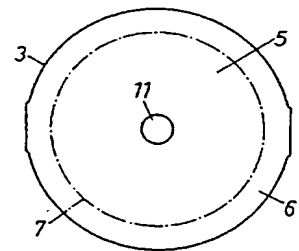
【図1】



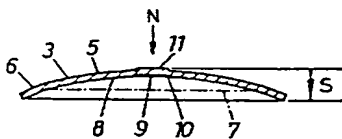
【図2】



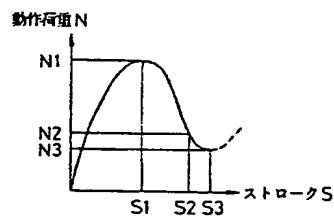
【図3】



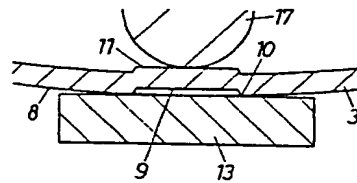
【図4】



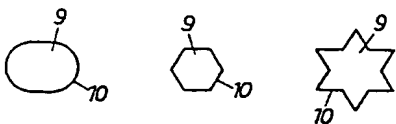
【図5】



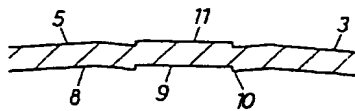
【図6】



【図7】



【図8】



Title: **JP2001216865A2: SWITCH**

Country: **JP Japan**

Kind: **A2 Document Laid open to Public inspection**

Inventor: **MASUDA MASAJI;**

Assignee: **FUJI DENSHI KOGYO KK**
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Published / Filed: **2001-08-10 / 2000-02-04**

Application Number: **JP2000000027860**

IPC Code: **None**

Priority Number: **2000-02-04 JP2000000027860**

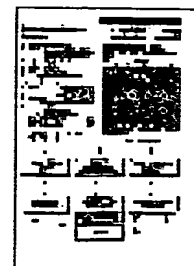
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Family: **None**

Other Abstract Info: **None**



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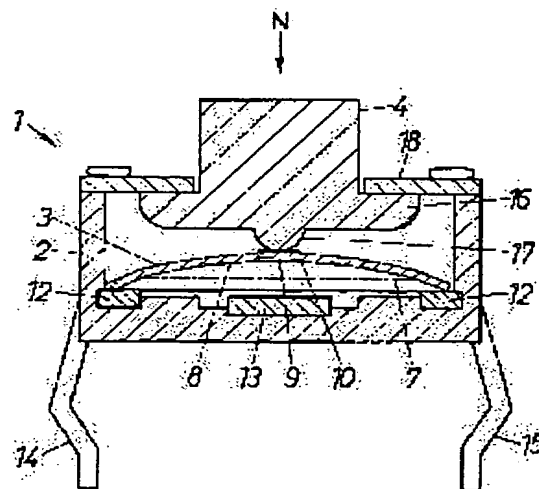
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(57) Abstract:

PROBLEM TO BE SOLVED: To provide a contact spring with a clicking action which is superior in the electrical stability in the contact between a movable contact part of the contact spring and a fixed contact part without curtailing the life of the contact spring in repeated uses of the dome-shaped contact spring with the clicking action.

SOLUTION: A hollow 9 is formed on an inner central part, that is a movable contact part 8 of the dome-shaped contact spring 3 with the clicking action, and an edge part 20 formed around the hollow 9 is linearly kept into contact with a surface of a fixed contact part 13, whereby the electrical stability in the contact of the movable contact part 8 and the fixed contact part 13 can be ensured, and the shortening of the service life of the contact spring 3 can be prevented since the movable contact part 8 is not perforated.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is concerned with the switch for a signal input used for electrical machinery and apparatus and electronic equipment, such as audio equipment, video equipment, communication equipment, and measuring equipment, and relates to amelioration of a traveling contact spring with click action by the shape especially of a dome.

[0002]

[Description of the Prior Art] Conventionally, the switch used for the signal input part of an electrical machinery and apparatus or electronic equipment has the fixed contact surface which counters the traveling contact section inside a contact spring with click action, and this contact spring by the shape of a dome. In order that the traveling contact section may prevent the poor contact by the field contact over a fixed contact surface, recently, the traveling contact which has a hole is used in many cases.

[0003] Elastic deformation of the contact spring is carried out by the thrust which acts on the crowning of a contact spring, and it makes the basis of click action reverse the direction of curvature at the time of switch actuation. At the time of this reversal, the edge section and the fixed contact surface of a periphery of the traveling contact section contact by line contact, will be in the condition of ON electrically, and will generate the signal according to the application of a switch. [of a hole] Thus, when contact to the edge section of the traveling contact section and a fixed contact surface turns into line contact instead of field contact and the contact pressure in the edge section becomes high to a detailed contaminant etc. by existence of the hole of the traveling contact section, the electric stability of contact to the traveling contact section and a fixed contact surface is improved substantially.

[0004]

[Problem(s) to be Solved by the Invention] When opening a hole in the traveling contact section, fabricating tabular spring material in the shape of a dome and manufacturing a contact spring with click action by the shape of a dome, By the springback of spring material, a contact spring does not become the shape of uniform dome shape after shaping. The movement magnitude (stroke) as an operating characteristic becomes large, the tensile stress applied to the perimeter of a hole at the time of the repeat activity of a contact spring and compressive stress become large, and a crack becomes easy to go into the perimeter of a hole. For this reason, there is a problem that the life as a product will become short. Especially current [to which the size of a contact spring is small] and this inclination are high.

[0005] Therefore, the object of this invention is offering the contact spring excellent in the electric stability of contact to the traveling contact section of a contact spring, and a fixed contact surface with click action without reducing the life of the contact spring, when carrying out repeat actuation of the contact spring with click action by the shape of a dome.

[0006]

[Means for Solving the Problem] This invention forms a hollow in the basis of the above-mentioned object by the shape of a dome, a part for an inside center section, i.e., the traveling contact section, of a contact spring with click action. Lowering of the life of a contact spring is prevented by considering as the configuration which does not open a hole in the traveling contact section at the same time it secures the electric stability of contact between both by contacting the edge section formed in the perimeter of this hollow by line contact to the front face of a fixed contact surface.

[0007] If it indicates concretely, the switch of this invention will contain the manual operation button which can be freely displaced in the direction of elastic deformation of the above-mentioned contact spring by the shape of a dome to switch casing in contact with the crowning of a contact spring with click action, and the above-mentioned contact spring. While making the periphery part of the above-mentioned contact spring contact a contact segment, a part for the inside center section of the above-mentioned contact spring is made into the

traveling contact section. In the switch which this traveling contact section is made to attach and detach to a fixed contact surface within the above-mentioned switch casing, and makes electrically between the above-mentioned traveling contact section and the above-mentioned fixed contact surfaces the condition of turning on and off The edge section which forms a hollow in the above-mentioned traveling contact section, and is formed in the perimeter of this hollow is contacted on the front face of the above-mentioned fixed contact surface.

[0008] Here, the above-mentioned hollow is formed as one configuration of circular, an ellipse form, a polygon, and stellate. Moreover, the edge section is formed as a discontinuous condition as a condition which continued around the hollow.

[0009]

[Embodiment of the Invention] Drawing 1 shows the condition of OFF of the switch 1 of this invention, and drawing 2 shows the condition of the ON. In these drawings, within switch casing 2, the switch 1 contacted the contact spring 3 with click action, and the crowning of this contact spring 3 by the shape of a dome, and has contained the manual operation button 4 which can be displaced in the direction of elastic deformation of the contact spring 3.

[0010] In the contact spring 3, it is formed in the shape of [one] a dome as a whole by the thickness of 0.06mm, and the about [diameter 3.5mm] stainless plate of the dome section 5 of predetermined curvature, and the skirt-board section 6 formed of a conical surface by part for the periphery edge of this dome section 5, and those boundary parts serve as the annular flection 7 so that may be looked at by drawing 1 , drawing 3 besides drawing 2 , and drawing 4 . The amount of, a part for the inside center section 5, i.e., the dome section, of the contact spring 3, inside center section is the traveling contact section 8 by the silver plating layer, and it forms the circular hollow 9 in this traveling contact section 8, and forms the edge section 10 around this hollow 9. Since this hollow 9 is usually formed in punching bending and coincidence by the press machine of the contact spring 3, a projected part 11 is formed in the lateral surface corresponding to a hollow 9.

[0011] The soffit part of the skirt-board section 6 of the contact spring 3 is in the condition dedicated to the interior of switch casing 2, always contacts, for example to the annular contact segment 12 currently embedded at the pars basilaris ossis occipitalis of switch casing 2, and has become switch-on electrically. Moreover, the edge section 10 of the traveling contact section 8 counters the fixed contact surface 13 currently embedded in the center of a pars basilaris ossis occipitalis of switch casing 2, contacts it, and is in the condition which can flow electrically. In addition, the contact segment 12 and the fixed contact surface 13 are united with the connection terminals 14 and 15 exposed to the exterior of switch casing 2, respectively.

[0012] And a manual operation button 4 is the interior of switch casing 2, and it contacts the projected part 11 of the crowning of the dome section 5 of the contact spring 3 by the projection 17 of an edge, displacement of it is attained in the direction of elastic deformation of the contact spring 3, and where a part is made to project outside by the contact to a flange 16 and the switch cover 18 fixed to switch casing 2, it is held.

[0013] Drawing 5 shows the graph of the property of the load N of operation (axis of ordinate) over the stroke S of the contact spring 3 (axis of abscissa). Although it will increase while the stroke S of the traveling contact section 8 (edge section 10) is mostly in direct proportion if the load N of the direction of a normal of operation acts to the core of the dome section 5 of the contact spring 3 so that drawing 4 may see When Stroke S passes over the stroke S1 which causes click action according to the load N1 of operation, the contact spring 3 A condition [that reversed the direction of curvature by click action, and move towards the same stroke S, become stroke S2 by the force corresponding to the small load N2 of operation after that, and it has been reversed with the load / smaller than former / N of operation] is maintained. If the load N2 of operation is lost, it will be reversed again to hard flow, and the contact spring 3 will return to the condition of a basis.

[0014] If an operator pushes a manual operation button 4 downward, according to the load N of operation, elastic deformation of the contact spring 3 is carried out, and it will be in a flat condition. If the traveling contact section 8 (edge section 10) passes over the stroke S1 which causes click action, the contact spring 3 will reverse the direction of curvature for a flection 7 as coil gland, and will contact the edge section 10 of the traveling contact section 8 on the front face of the fixed contact surface 13 so that drawing 2 and drawing 6 may see. By this, the edge section 10 and the fixed contact surface 13 of the traveling contact section 8 flow electrically, and will be in the condition of ON.

[0015] In the state of this ON, the edge section 10 of the traveling contact section 8 serves as annular line contact, and contacts the front face of the fixed contact surface 13. Therefore, since the contact pressure of the edge section 10 of the traveling contact section 8 to the fixed contact surface 13 becomes high even if a detailed contaminant etc. adheres among those contact parts, the stability of contact to the edge section 10 of the traveling contact section 8 and the fixed contact surface 13 is improved substantially, and an electric property also becomes good.

[0016] And although the bending strain stress at the time of press working of sheet metal becomes depressed and

being remained in the perimeter of 9 by formation of a hollow 9, the strain stress of the part of a hollow 9 is smaller than the shear strain stress when forming a hole, and the tensile stress applied to the perimeter of a hollow 9 at the time of the elastic deformation of the contact spring 3 and compressive stress are small as compared with the hole. Therefore, a crack cannot go into the part of the hollow 9 of the contact spring 3 easily, and the life of the contact spring 3 becomes long as compared with the conventional thing. In addition, since the depth of a hollow 9 affects the spring property of the contact spring 3, it is desirable to hold down to $2/3$ or less [of the board thickness of the contact spring 3].

[0017] Incidentally, the configuration of a hollow 9 cannot be restricted circularly, but as shown in drawing 7 , it can also be formed as a configuration an ellipse form, a polygon, stellate. Moreover, a hollow 9 can also be formed by upheaving the periphery part of the part which becomes depressed in the traveling contact section 8 of the contact spring 3, and is set to 9 in the direction of the fixed contact surface 13, as shown in drawing 8 . In this case, the edge section 10 will become depressed with that burr, and will be formed between 9. Incidentally, a hollow 9 may be a semi-sphere side-like thing. Furthermore, although the edge section 10 is annular as a desirable example and is continuing, it may be formed in the discontinuous condition.

[0018]

[Effect of the Invention] Since the edge section formed in the perimeter of the hollow of the traveling contact section of a contact spring contacts the front face of a fixed contact surface by line contact in this invention, also by inclusion of a detailed contaminant etc. Since the contact pressure between them is heightened, and a stable contact condition can be secured electrically and the hole is not opened in the traveling contact section of a contact spring, The tensile stress and compressive stress which are generated around a hollow are low stopped as compared with a hole, a crack cannot go into the edge section easily, the life of a contact spring becomes long, and a stable switching function can be expected over long duration.

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CLAIMS

[Claim(s)]

[Claim 1] A part for the inside center section of a contact spring with click action is made into the traveling contact section by the shape of a dome. In the switch which this traveling contact section is made to attach and detach to a fixed contact surface, and makes electrically between the above-mentioned traveling contact section and the above-mentioned fixed contact surfaces the condition of turning on and off The switch characterized by contacting the edge section which forms a hollow in the above-mentioned traveling contact section, and is formed in the perimeter of this hollow on the front face of the above-mentioned fixed contact surface.

[Claim 2] To switch casing, a contact spring with click action at the shape of a dome, And while containing the manual operation button which can be freely displaced in the direction of elastic deformation of the above-mentioned contact spring in contact with the crowning of the above-mentioned contact spring and making the periphery part of the above-mentioned contact spring contact a contact segment In the switch which makes a part for the inside center section of the above-mentioned contact spring the traveling contact section, and this traveling contact section is made to attach and detach to a fixed contact surface within the above-mentioned switch casing, and makes electrically between the above-mentioned traveling contact section and the above-mentioned fixed contact surfaces the condition of turning on and off The switch characterized by contacting the edge section which forms a hollow in the above-mentioned traveling contact section, and is formed in the perimeter of this hollow on the front face of the above-mentioned fixed contact surface.

[Claim 3] The switch according to claim 1 or 2 characterized by forming a hollow as one configuration of circular, an ellipse form, a polygon, and stellate.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view of an off condition with the switch of this invention.

[Drawing 2] It is the sectional view of the condition of ON with the switch of this invention.

[Drawing 3] It is the top view of a contact spring.

[Drawing 4] It is the sectional view of a contact spring.

[Drawing 5] It is the graph of the stroke-actuation load of a contact spring.

[Drawing 6] They are some expanded sectional views of the contact condition of the edge section of the traveling contact section of a contact spring, and a fixed contact surface.

[Drawing 7] It is the top view of the hollow of other configurations.

[Drawing 8] They are some expanded sectional views of other hollows.

[Description of Notations]

- 1 Switch
- 2 Switch Casing
- 3 Contact Spring
- 4 Manual Operation Button
- 5 Dome Section
- 6 Skirt-Board Section
- 7 Flection
- 8 Traveling Contact Section
- 9 Hollow
- 10 Edge Section
- 11 Projected Part
- 12 Contact Segment
- 13 Fixed Contact Surface
- 14 Connection Terminal
- 15 Connection Terminal
- 16 Flange
- 17 Projection
- 18 Switch Cover

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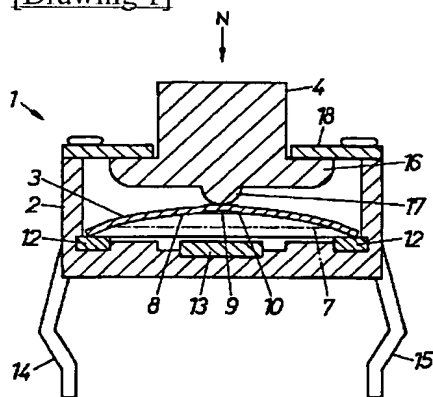
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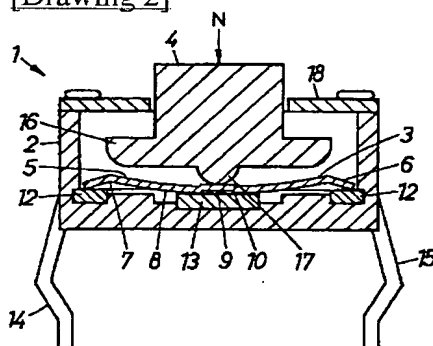
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DRAWINGS

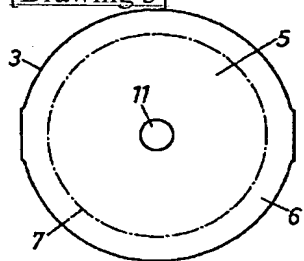
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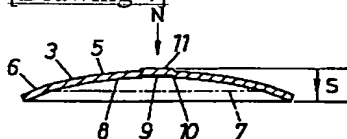
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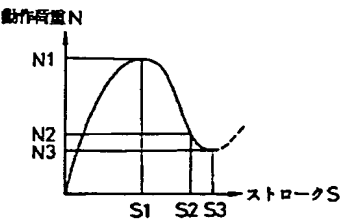
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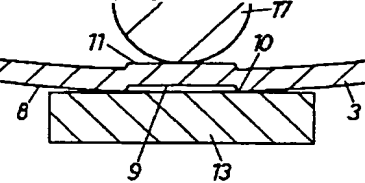
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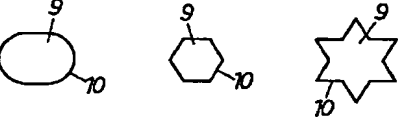
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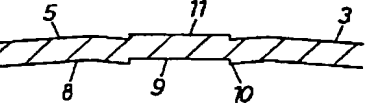
[Drawing 6]



[Drawing 7]



[Drawing 8]



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